

1 124. A method of determining one of a movement direction, spin rate, and spin axis  
2 orientation of an object, the object having a movement path section that is substantially non-  
3 curvilinear, comprising the steps of:  
4 a) aligning a plurality of electro-magnetic energy transmission paths to be non-parallel to the  
5 object's substantially non-curvilinear movement path section;  
6 b) reflecting electro-magnetic energy from each of the plurality of transmission paths off the  
7 object for at least a portion of the substantially non-curvilinear movement path section;  
8 c) receiving the electro-magnetic energy reflected off the object from each of the plurality of  
9 transmission paths; and  
10 d) determining one of a movement direction, spin rate, and spin axis orientation of the  
11 object based on the reflected electro-magnetic energy received from each of the plurality  
12 of transmission paths and while the object was traveling in the at least a portion of the  
13 substantially non-curvilinear movement path section.

1 125. The method of determining one of a movement direction, spin rate, and spin axis  
2 orientation of an object of claim 124, further comprising the step of applying an electro-  
3 magnetic contrasting mark to the object.

1 126. The method of determining one of a movement direction, spin rate, and spin axis  
2 orientation of an object of claim 124, further comprising the step of applying a symmetrically  
3 shaped electro-magnetic contrasting mark to the object.

RS001US

2

1 127. The method of determining a movement characteristic of an object of claim 124,  
2 wherein the object is a golf ball and the substantially non-curvilinear movement path section  
3 is located within several feet of the location of where the golf ball is struck.

1 128. The method of determining a movement characteristic of an object of claim 125,  
2 wherein the plurality of transmission paths includes at least two transmission paths.

1 129. The method of determining a movement characteristic of an object of claim 125,  
2 wherein the plurality of transmission paths includes at least three transmission paths.

C1  
1 130. A method of determining one of the spin rate and spin axis orientation of a  
2 moving object, the object having a movement path section, comprising the steps of:  
3 a) applying an electro-magnetic contrasting mark to the object;  
4 b) aligning a plurality of electro-magnetic energy transmission paths to be non-parallel to the  
5 object's movement path section;  
6 c) reflecting electro-magnetic energy off the object from the plurality of electro-magnetic  
7 energy transmission paths;  
8 d) receiving the electro-magnetic energy reflected off the object from the plurality of electro-  
9 magnetic energy transmission paths; and  
10 e) determining one of the spin rate and spin axis orientation of the object based on the  
11 received electro-magnetic energy from the plurality of electro-magnetic energy  
12 transmission paths.

RS001US

3

1 131. The method of determining one of the spin rate and spin axis orientation of the  
2 object of claim 130, wherein step a) includes applying a symmetrically shaped electro-  
3 magnetic contrasting mark to the object.

C 1 132. The method of determining one of the spin rate and spin axis orientation of the  
2 object of claim 130, wherein step a) includes applying a plurality of electro-magnetic  
3 contrasting marks to the object.

1 133. The method of determining one of the spin rate and spin axis orientation of the  
2 object of claim 130, wherein step a) includes applying a plurality of symmetrically shaped  
3 electro-magnetic contrasting marks to the object.

RS001US

4

1 134. An apparatus for determining one of a movement direction, spin rate, and spin  
2 axis orientation, comprising:

3 a) a moving object, the object having a movement path section that is substantially non-  
4 curvilinear;

5 b) a plurality of sensors, each sensor having an electro-magnetic energy transmission path  
6 that is aligned to be non-parallel to the object's substantially non-curvilinear movement  
7 path section, each sensor reflecting electro-magnetic energy along its transmission path  
8 off the object for at least a portion of the substantially non-curvilinear movement path  
9 section, and each sensor receiving electro-magnetic energy reflected off the object; and

C 10 c) means for determining one of a movement direction, spin rate, and spin axis orientation  
11 of the object based on the electro-magnetic energy received at each of the plurality of  
12 sensors while the object was traveling in the at least a portion of the substantially non-  
13 curvilinear movement path section.

1 135. The apparatus for determining one of a movement direction, spin rate, and spin  
2 axis orientation of claim 134, wherein the object includes an electro-magnetic contrasting  
3 mark.

1 136. The apparatus for determining one of a movement direction, spin rate, and spin  
2 axis orientation of claim 134, wherein the object is a golf ball and the substantially non-  
3 curvilinear movement path section is located within several feet of the location of where the  
4 golf ball is struck.

RS001US

5

1 137. The apparatus for determining one of a movement direction, spin rate, and spin  
2 axis orientation of claim 135, wherein the plurality of sensor includes at least three sensors.

1 138. An apparatus for determining one of a spin rate and spin axis orientation,  
2 comprising:

3 a) a moving object, the object having a movement path section;

4 b) a plurality of sensors, each sensor having an electro-magnetic energy transmission path  
5 that is aligned to be non-parallel to the object's movement path section, each sensor  
6 reflecting electro-magnetic energy along its transmission path off the object for at least a  
7 portion of the movement path section, and each sensor receiving electro-magnetic energy  
8 reflected off the object; and

9 c) means for determining one of the spin rate and spin axis orientation of the object based on  
10 the electro-magnetic energy received at each of the plurality of sensors.

1 139. The apparatus for determining one of a spin rate and spin axis orientation of claim  
2 138, wherein the object includes an electro-magnetic contrasting mark.

1 140. The apparatus for determining one of a spin rate and spin axis orientation of claim  
2 139, wherein the plurality of sensor includes at least three sensors.

RS001US

6

1 141. (Amended) A ball adapted for determination of one of the ball's movement  
2 direction, spin rate, and spin axis orientation, comprising:

3 a symmetrically shaped area having a electro-magnetic contrast different  
4 from the ball remainder, the area configured to enable the determination of a three  
5 dimensional velocity vector for the ball ~~one of the ball's movement direction,~~  
6 ~~spin rate, and spin axis orientation~~ based on electro-magnetic energy reflected off  
7 the ball from a plurality of transmission paths and one of the ball's movement  
8 direction, spin rate, and spin axis orientation based on the three dimensional  
9 velocity vector.  
10

1 142. (Deleted).

1 143. The ball adapted for determination of one of the ball's movement direction, spin  
2 rate, and spin axis orientation of claim ~~142~~141, wherein the plurality of areas have a circular  
3 shape.

1 144. (Deleted).

1 145. (Deleted).

1 146. (Deleted).

RS001US

7

1 147. (Newly Added) A method of determining one of a movement direction, spin rate,  
2 and spin axis orientation of an object, the object having a movement path, comprising the  
3 steps of:  
4 a) reflecting electro-magnetic energy from a plurality of transmission paths off the object for  
5 at least a portion of movement path section;  
6 b) receiving the electro-magnetic energy reflected off the object from each of the plurality of  
7 transmission paths; and  
8 c) determining a three dimensional velocity vector for the object;  
9 d) determining one of a movement direction, spin rate, and spin axis orientation of the  
C1 10 object based on the three dimensional velocity vector.

1 148. (Newly Added) The method of determining one of a movement direction, spin  
2 rate, and spin axis orientation of an object of claim 147, further comprising the step of  
3 applying an electro-magnetic contrasting mark to the object.

1 149. (Newly Added) The method of determining a movement characteristic of an  
2 object of claim 147, wherein the object is a golf ball and the movement path section is  
3 located within several feet of the location of where the golf ball is struck.

1 150. (Newly Added) The method of determining a movement characteristic of an  
2 object of claim 148, wherein the plurality of transmission paths includes at least two  
3 transmission paths.

RS001US

8